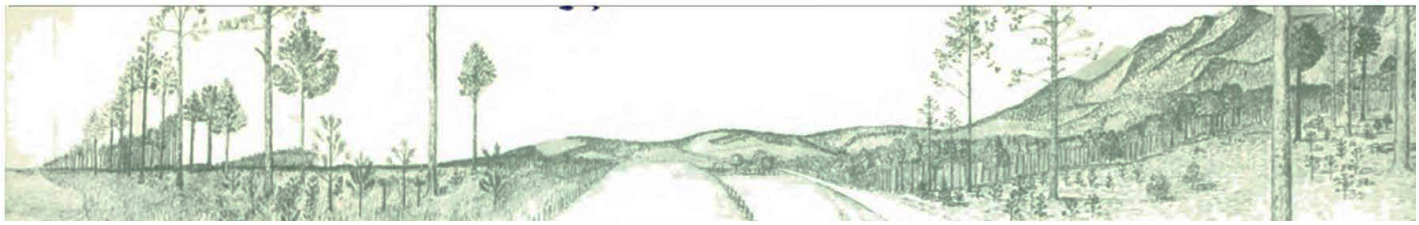

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ESTIMATING SOUND SEED PER CONE IN SHORTLEAF PINE

In any given seed year, a few cones with a large number of seed per cone could produce as many seed per acre as many cones with few seed per cone. Therefore, in determining the minimum number of cones per acre necessary to regenerate shortleaf pine, it is advisable to measure the number of sound seed per cone as well as total cone production. The job can be done using one of several methods such as scale-by-scale dissection, cone drying and extraction, or estimating the number of sound seed by cutting the cone. The complete scale-by-scale dissection and removal of seed from the cone is the most accurate method but is too tedious. Cone drying and extraction is satisfactory for a large number of cones but is not suitable for individual cones. The estimate of sound seed per cone by cutting the cone in a longitudinal section has been used by McLemore 1/ for three southern pines, slash, loblolly and longleaf. He developed a regression equation for estimating sound seed per cone for each species. This method appeared practical for use in seed production studies and was therefore adapted to the shortleaf pine seed production studies in Virginia.

Two hundred cones were sampled from 28 shortleaf pines in central Piedmont Virginia and sliced longitudinally in half with a cone cutter similar to the one described by Winjum and Johnson. 2/ The cut surfaces were examined to determine the total number of sound seeds that had been sliced during cutting. Sliced sound seeds were easily detected by the exposed white endosperm (fig. 1).

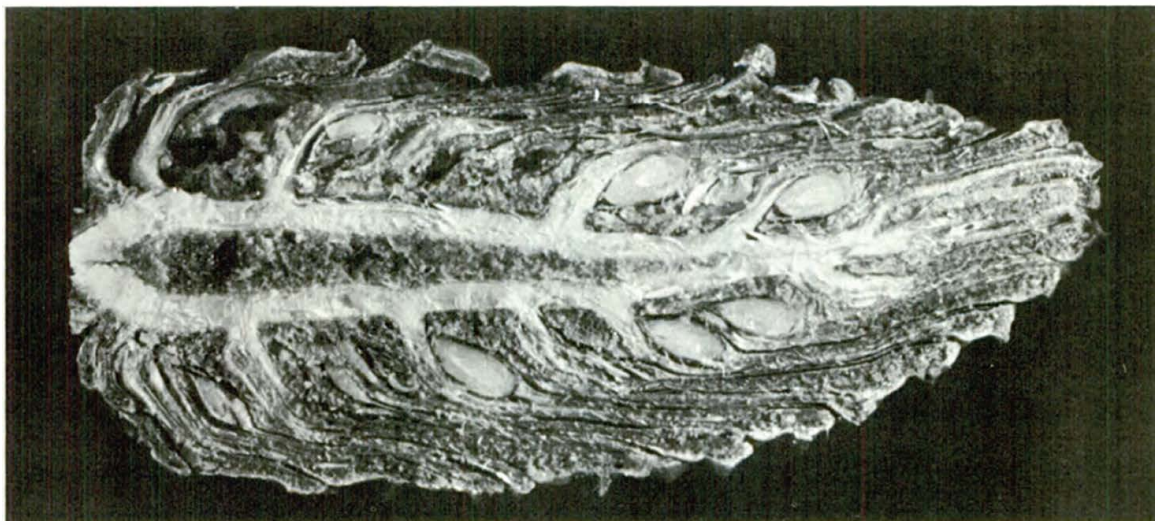

Figure 1.--Exposed seeds in a sliced shortleaf cone (3X).

1/ McLemore, B. F. Predicting seed yields of southern pine cones. Jour. Forestry 60: 639-641. 1962.

2/ Winjum, Jack K., and Johnson, Norman E. A modified-knife cone cutter for Douglas-fir seed studies. Jour. Forestry 58: 487-488. 1960.

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It was necessary to examine the cut surfaces of both halves because occasionally a seed was sliced in such a manner as to expose its endosperm on one surface only. Both cone halves were then dissected by hand and all remaining unsliced seeds removed. A cutting test was used to determine soundness. The number of sliced seed in the 200 sample cones ranged from 0 to 14 per cone and the total number of sound seed varied from 0 to 71. Plotting of the data indicated a linear relationship and, therefore, linear regression analysis was used.

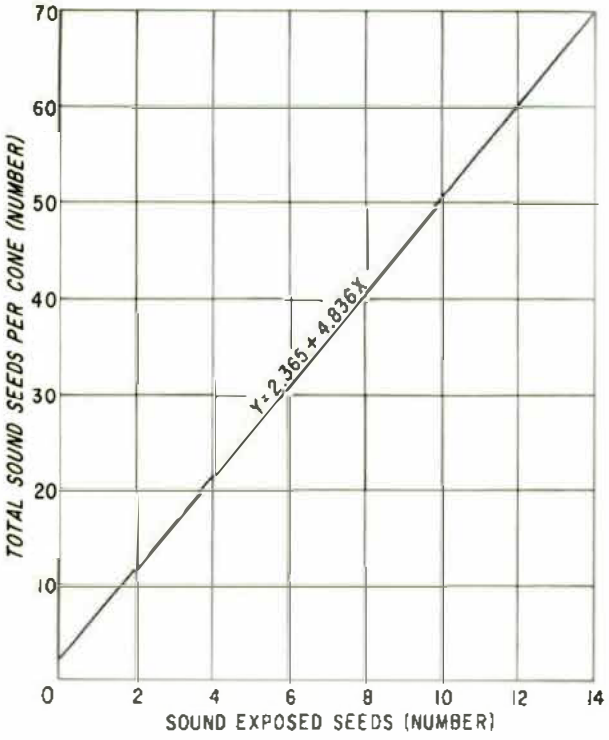

Figure 2.--Relationship of sound exposed seeds in sliced cones to the total number of sound seeds per cone.

The prediction equation derived from the data is shown in figure 2, where X = the total number of seed exposed in slicing.

The correlation coefficient was 0.8833.

The regression equation established for shortleaf cones can be used to determine rapidly the number of sound seed per cone of large cone samples. The sample cones are sliced and then both halves are compared so that the investigator can be sure each cut seed is counted. Then, using the number of sound cut seed as "X" in the prediction equation, the number of sound seed per cone can be estimated. If several cones are used in one sample, then the average number of exposed seed should be used as "X."

The equation was derived from cones sampled in a rather good seed year for shortleaf. Consequently, the equation might overestimate the number of seed per cone in an extremely poor seed year, since it gives a positive value even when no seeds are exposed in slicing.

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